Another similarity between light and rain on a sidewalk is in the blackening effect. With light the blackening (during development) increases with the exposure received by the sensitive film emulsion. The photographic lens and shutter assembly should be regarded as a device that controls the camera exposure received by the light-sensitive film emulsion inside the camera.

The aperture of the lens diaphragm controls the intensity of the light, and the shutter controls the time of exposure. Since a photographic reproduction of the original scene contains a range of tones of different brightness, a corresponding range of photographic exposure is given to the sensitized emulsion.

FILM LATITUDE

A negative is said to be correctly exposed when it gives a satisfactory rendition of detail in both the deepest shadows and brightest highlights of the scene or subject. Fortunately, in many cases, there is more than a single exposure that will produce this result — there is a wide range of possible exposures within which satisfactory tone separation is possible. The "minimum" satisfactory exposure is one in which good tone separation is just attained in the deepest shadow areas. The "maximum" satisfactory exposure is one in which detail is just retained in the brightest highlight. Any additional exposure will cause this highlight detail to become flattened out or "blocked up."

The range between these two exposures is known as latitude. This latitude may be narrow or wide, depending on the subject matter, lighting contrast, type of film and degree of development of the negative. In general, the black-and-white films you will be using have a greater margin for error than color films. Ignoring the influence of development for a moment, a softly lighted scene composed of objects that are, themselves, fairly uniform intone will allow a wide range of possible exposures that will produce a satisfactory rendition on the negative. This is caused by the narrow range of tonal values from highlight to shadows in the subject. On the other hand, a brilliantly lighted scene composed of a variety of tones, from jet black to snow white, may take up the entire usable range of the negative scale. Therefore, the exposure required for the proper rendition of the entire range of tonal values in this scene may be quite critical.

In addition there are many scenes, such as interiors with sunlight coming through a window, that have a range of brightness so wide that no single exposure can produce both highlight and shadow detail in a black-and-white negative. When you increase exposure and reduce the amount of development, almost any ordinary extreme of brightness range can be accommodated on black-and-white film.

FILM SPEED

The sensitivity of black-and-white and color film for still-camera use is also called the film speed, the ISO speed or simply the ISO. Earlier in this chapter, we pointed out that "ISO" is an acronym for International Standards Organization, a federation of all national standard bodies of the world, which has approved a uniform set of film-speed standards. These standards call for a universal expression of both arithmetic and logarithmic values with the ISO designation.

Until early 1983 the emulsion speeds of still-camera film were expressed in ASA values (which are arithmetic) or in DIN values (which are logarithmic). ASA values were determined according to standards published by the American National Standards Institute, formerly American Standards Association from which the designation ASA came. The DIN values reflected the German standards established by the Deutsche Industrie Norm.

Film speed is determined by the manufacturer according to the ISO standards. It will generally look like this:

ISO 100/21°

The number immediately following "ISO" is the ASA equivalent. It indicates that the speeds progress arithmetically, and any film marked ISO 100 has the same sensitivity as any other film marked ISO 100 — it is twice as fast as film marked ISO 50 and is half as fast as film marked ISO 200. The number with the degree symbol (^{0}) is the DIN equivalent.

The arithmetic speed number is intended for exposure meters or cameras marked for ISO or ASA speeds or exposure indexes. The logarithmic speed is intended for exposure meters or cameras marked for ISO or DIN settings.

FILM TYPES

Photographic films (and papers) are composed of two basic parts: the emulsion and the base, or support. The emulsion is the light-sensitive portion of a film or paper that records the image. The emulsion contains the silver halides and any special sensitizing dyes suspended in a binder of gelatin. The gelatin holds the silver halides evenly dispersed and prevents action by a developer until the silver halides have been made developable either by exposure to light or chemical action. The gelatin also acts as a sensitizer for the silver salts.

In photographic films and papers, the main purpose of the base is to support or hold the emulsion in place. Depending on how the recorded image is to be used, the base or support may be transparent or opaque. A transparent base is used for transparencies viewed by transmitted light and for negatives printed with transmitted light. An opaque base is used for prints that are viewed by reflected light.

The latest state of the art in light-sensitive materials used in photography is the use of the electronic medium. Still video disks do not contain an emulsion or a base. When video mediums are used, light is converted to electrical impulses, and these impulses are stored magnetically on a tape or disk. Since it is the camera itself that converts the light to electrical impulses, the recording medium and all stages of the photographic process can be carried out in normal room light.

Black-and-White Film

The characteristics and use of black-and-white film depends largely on the actual construction of the emulsion. These characteristics include the following: the degree of sensitivity to light, response to various colors of light (color or spectral sensitivity), contrast, exposure latitude, emulsion latitude, and emulsion definition.

There are many types of black-and-white films available. Each differs from others in one or more characteristics. You should become acquainted with the characteristics of films. This knowledge is helpful in selecting the film most suitable for each photographic assignment.

Color Negative Film

A color negative film records a scene in image densities opposite to the brightness of objects in the scene, the same as a black-and-white negative film. Color films can be recognized because they contain the suffix “color,” such as Vericolor, Kodacolor and Fujicolor. These color films are used when a print is the final product. Most color negatives (except for color film used for aerial photography) has an orange mask incorporated init. This orange mask increases the color separation which reproduces colors more accurately in the final print.

During development, colors that are complementary to the color in the original scene are formed in the emulsion. For example, a red object in the scene is recorded as cyan in the negative. A combination of yellow, magenta, and cyan record all the other colors that we see in the scene. Color dyes in the emulsion layers control the colors of light passing through the color negative.

To produce color prints or color transparencies, you can print color negative film images on color positive materials such as color paper and color print film. Color negatives also can be printed on a special panchromatic black-and-white paper to produce black-and-white prints.

Amateur and Professional Color Films

Much of the color film used in the Navy is manufactured by the Eastman Kodak Company. Kodak markets color films for both professional and amateur photographers. Color films intended for use primarily by professionals are identified by the word professional in the name — for example, Kodak Vericolor III Professional Film, Type S (VPS).

Both professional and amateur films have similar color quality, sharpness and granularity characteristics. They also have emulsions made up of many different chemicals that tend to change slowly with time. From the day they are made, all color films begin to change, and as the films age, their color balance changes.

Amateur films are manufactured to age and reach a peak color balance much later than professional films. The manufacturer allows for the time amateur film will be in storage, on the store shelf, and in the camera before it is developed. The ISO speed assigned is adequate for calculating exposure for normal picture-taking situations.

Professional films are manufactured so they are very near their optimum color balance at the time they are shipped from the factory. These films should be kept refrigerated or frozen until shortly before use. Refrigeration keeps the film near the optimum point until used and provides the photographer with confidence in consistent results. Precise film speeds are provided for professional films. The film is intended for prompt processing to prevent any significant shift in color balance after exposure.

MEASURING EXPOSURE

The quantity of light can be measured in several ways. The most accurate method is the use of exposure meters. Photographic exposure meters are designed to be sensitive to light in the same reamer as panchromatic film. Therefore, an exposure meter reading can be assumed to be valid under any visible lighting condition. Several types of hand-held meters are available. Some measure incident light; some measure reflected light. Another line of light meters measure light only within the sensitivity range of the human eye.

However, for news photography and most other requirements of a Navy journalist, the built-in light meter described earlier in this chapter should more than satisfy your needs. This battery-powered meter, which measures reflected light, works automatically (unless you use the manual setting) to give you the correct exposure. When used manually, the built-in meter functions the same as a comparable hand-held meter and allows you to make whatever adjustments you prefer to achieve stylized or creative photographs. Except in cases involving special motion-picture film lighting and portrait studio work, the hand-held exposure meter has virtually been replaced by the built-in camera meter.

Before using any exposure meter, read the instruction book that comes with it to make sure that you use it correctly. The readings from an exposure meter, and the accuracy of the meter itself, are wholly dependent on the method used.

CAMERA SETTINGS

When the photographer knows the sensitivity of the film and the amount of light available, the user determines the settings on the camera that will give the film a correct exposure. The settings are the f/stops and the shutter speed. Together, they control the total amount of light allowed through the camera to form the latent image on the film.

F/stops can range from f/1.4 (most amount of light) to f/22 (least amount of light). The f/stop system (factorial system) is always read as a whole number, not as a fraction or ratio.

Full stops in the English system of f/stops are as follows: 1.0, 1.4, 2.0, 2.8, 4.0, 5.6, 8, 11, 16, 22, 32, 45, 64, 90, and so on. Notice that the number doubles for each two-stop decrease in size. Slight optical confections are made for f/11 and f/45. This may seem confusing at first, but knowledge of the f/stop system is necessary to compute optical formulas used by advanced photographers. It is necessary to know that each marked f/stop on a lens, except its widest aperture, is usually a full stop — that is, it admits one-half or twice the amount of light as the adjacent stop, and the larger the number, the smaller the aperture. At first, it is perhaps easier to think of the f/stops in terms of fractions; 1/8 is larger than 1/11 which is, in turn, larger than 1/16.

Lens apertures can be set between marked f/stops. You could match information on the exposure calculation dial of an exposure meter. For example, if the light meter suggests an exposure of 1/125" at f/9.5,

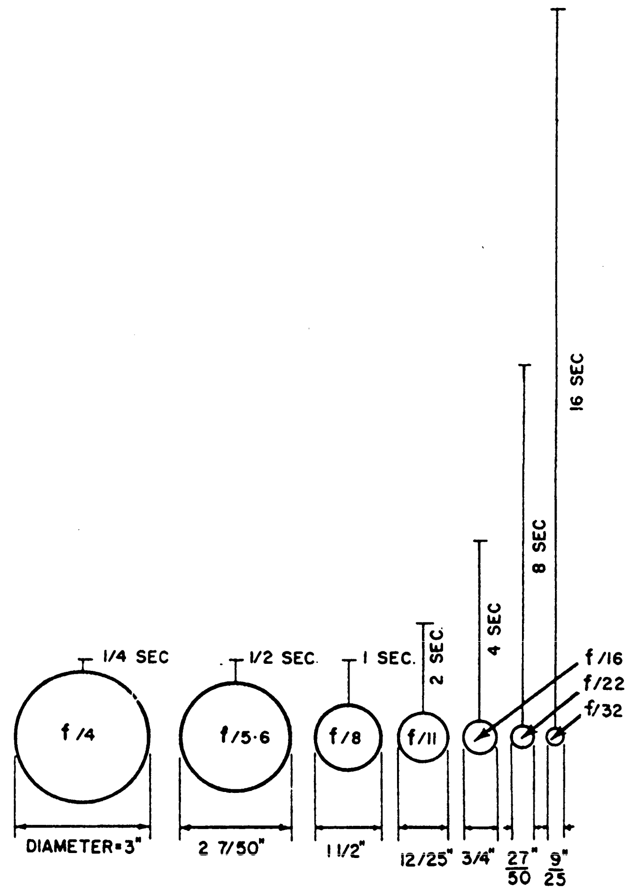

Figure 11-20.—Comparison between aperture, f/stop and relative exposure.

you could set the camera at 1/125" at f/8, allowing the film latitude to cover the difference, or at 1/125" with the lens aperture midway between V8 and f/l1, which would be more accurate (fig. 11-20).

Shutter speeds control the duration of time that light is allowed to pass through the lens aperture to the film. Shutter speeds are usually marked on the camera as the reciprocal of the fraction of a second that the shutter remains "open" (one is 1/1 or one second, two is 1/2 or one-half second, four is 1/4 or one-quarter second, and soon).

Standard shutter speeds are l", 1/2", 1/4", 1/8", 1/15", 1/30", 1/60", 1/125", 1/250", 1/500", 1/1000" and 1/2000".

f/Stop-Shutter Speed Combinations

With today's cameras offering you the opportunity to use automatic settings, you could just concern yourself with the f/stops of the camera and let the automatic shutter speed controls of the camera do the rest. However, should you choose to work with your camera in manual mode, you must understand the relationship between the f/stop and shutter speed.

Shutter speeds are indicated so that each marked shutter speed admits one-half or two times the adjacent marked speed. Since both the lens aperture and shutter speed represent “full stop” changes in exposure, either can be moved as long as the other is moved a similar number of stops to compensate. A basic exposure of 1/125" at f/16 can be changed to 1/500" (two stops less light transmitted) at f/8 (two stops more light transmitted), and the result will be the same total amount of light transmitted to the film.

Shutter speeds cannot be set between marked “stops.” If an exposure is calculated to be 1/40" at f/8, using the closest shutter speed available on your camera, 1/30" or 1/60" will not result in an exposure error because of the exposure latitude of the film. An alternative is to set the shutter speed and an equivalent “half-stop” of lens apeture, such as 1/30" at f/9.5, or 1/60" at f/6.3.

With a selection of possible combinations, which should be used? Does it matter which is used? Why does the manufacturer put so many combinations on the camera?

Before these questions are answered, you must understand the correlation of lens apertures and shutter speeds. Think of the lens aperture as a water pipe (the larger the diameter of the pipe, the more the water can flow). Extending this further, think of the film sensitivity in terms of a bucket that has to be filled and the light intensity as the water pressure.

If a bucket can be filled in 1/30" with a pipe 8 square inches in area, how long would it take to fill using a pipe 4 square inches in area? Obviously, twice as long — 1/15". If the exposure is calculated at 1/30" at f/11, how long an exposure is required at f/16 (the aperture one-half the area of f/11)? The answer is 1/15".

What happens if the water pressure increases? It takes less time to fill the bucket. If we use a larger bucket (lower ISO film speed), it takes more water (exposure) to fill it.

Shutter Speed Considerations

Generally, the shutter speed is chosen according to the amount the subject moves or how much of the movement you desire to show. If the subject moves slowly, a slower shutter speed can be used; if the subject moves rapidly, a faster shutter speed must be used to stop the movement and prevent blurring the image. Movement of the camera and photographer also must be considered. Therefore, the use of a tripod or similar brace is advisable when using a shutter speed slower than the reciprocal of the lens focal length; for example, 50mm lens (1/60"), and 200mm lens (1/250").

To stop the movement or action in a picture, you must consider the following three factors:

- The relative movement of the subject
- The subject’s direction of movement
- The camera-to-subject distance

THE RELATIVE MOVEMENT OF THE SUBJECT.— The faster the movement, the faster the shutter speed required. The term *relative movement* is used because if the motion of the subject is followed, that is, the action is “panned” with the camera, a slower shutter speed can be used than if the camera were held stationary.

THE SUBJECT’S DIRECTION OF MOVEMENT.— A subject traveling at a right angle to the camera/lens axis requires a faster shutter speed than one traveling at a diagonal. Conversely, a subject moving toward or away from the camera, parallel to the lens axis, can be “stopped” with a slower shutter speed than movement in other directions (fig. 11-21).

THE CAMERA-TO-SUBJECT DISTANCE.— The closer the action is to the camera, the faster the shutter speed must be. A car traveling 60 miles per hour across the lens axis at a distance of 100 feet would be “stopped” by a shutter speed of 1/1000" (or perhaps 1/500"). However, if the camera-to-subject distance were increased to 500 feet, the action could be “stopped” with a shutter speed of “1/250" or” 1/125." If the car was a half mile away, 1/60" should be sufficient to stop the movement.

DEPTH OF FIELD

Selection of a f/stop is done mainly for the desired depth of field. “Depth of field” is defined as the distance between the nearest and farthest points of acceptable sharp focus of the scene photographed (fig. 11-22).

Control of the depth of field is a valuable tool in photography. Depth-of-field charts are given in all camera instruction books as well as in photographic reference manuals, but many photographers fail to use them to their own advantage.

Simply stated, depth of field increases as the focal length of the lens decreases (a shorter focal-length lens is used), as the lens aperture decreases (gets smaller in size) and as the distance focused on (focal point) increases, or both. Inversely, depth of field is less for long-focal-length lenses than for short-focal-length

SUBJECT	DIRECTION ↕	⤡	↔
Pedestrian (4 MPH)	1/60	1/125	1/125
Tractor (8 MPH)	1/125	1/250	1/250
Runner (12 MPH)	1/125	1/250	1/500
Sports, general (15 MPH)	1/250	1/500	1/1000
Horse, galloping (20 MPH)	1/250	1/500	1/1000
Automobile (35 MPH)	1/250	1/500	1/1000

Figure 11-21.—Slowest shutter speeds necessary to stop action.

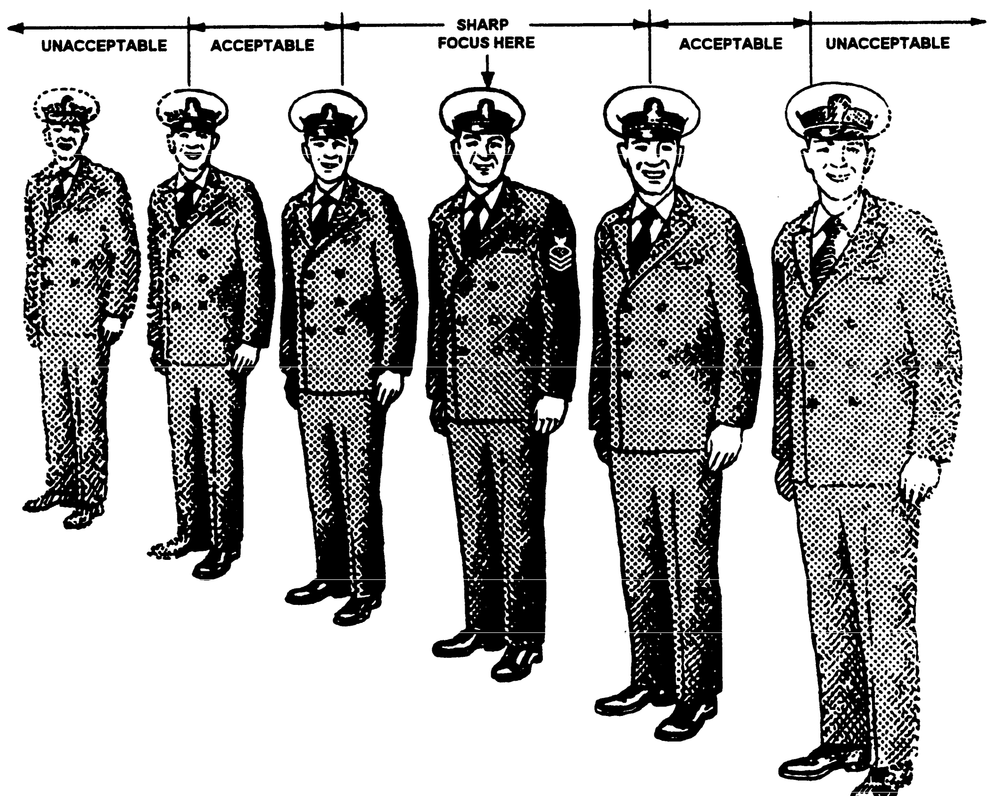

Figure 11-22.—Depth of field.

lenses, is less for wider apertures and is less for shorter lens-to-subject distances.

A peculiarity of the term *depth of field* is that it is usually used to define a condition of maximum depth of field; and when the depth of field is shallow or purposely restrictive, the term *selective focus* is used. Selective focus is merely "selecting" a depth of field that will satisfy a requirement to have the foreground, background, or both, not in sharp focus. The use of selective focus to make the main subject standout in the picture by being "sharp" while the rest of the image area is blurred is a good technique for gaining subject emphasis.

The importance of proper focus and shutter speed cannot be overemphasized. Incorrect focus, subject movement, camera movement, improper use of depth of field, and so forth, can result in a blurred image on the photographic negative that cannot be connected in any way. Film latitude can take care of minor errors in the exposure, but there is no latitude for focus and stop action. An image is either in focus or out of focus; action is either stopped or blurred.

DIRECTING PHOTOGRAPHIC SUBJECTS

LEARNING OBJECTIVE: Detail the methods used in coordinating individual and group photographs.

One of the most difficult tasks of photographing people is directing them. Since you are the only person who can see what the picture will look like before it is taken, you must take responsibility for "the.pose."

INDIVIDUAL PICTURES

As a Navy journalist you will take pictures of individuals for a multitude of projects, such as news releases, familygrams and cruisebooks. Therefore, you should be familiar with the methods used to direct photographic subjects.

One way to make directing and posing easier is to give your subject an object to handle. Do not tell him to "just stand there," as though in a vacuum, with nothing to do. Men and women can hold a book binoculars or a tool used in their work. Children will do fine with a doll or model airplane.

Another strategy is to give your subject something to lean or sit on. Use a chair, stool, post or tree.

If you use props in your individual photographs, make sure you do your homework. For instance, do not photograph a gunner's mate holding a 3-inch shell in front of a 5-inch gun mount.

Eyes are very important when photographing people. When the subject's eyes look straight into the camera, a strong and immediate impact is created that attracts the viewer's interest. When the eyes are directed away from the camera, the effect is less explicit and has more of an ambiguous quality. Decide on the approach that is best for your photograph and direct your subject appropriately.

Finally, you must be in charge of the situation. It is up to you to tell the subject what to do, how to do it and when to do it. This applies to a vice admiral as well as a seaman.

Many people are nervous and self-conscious in front of a camera. They try to look their best, and in doing so often present a stilted expression or pose. It is your job to give directions regarding their pose. It is also your responsibility to make sure that coat sleeves are pulled down and wrinkles are smoothed out. Make sure the subject's hat is set at the proper angle. If you ignore these potential problem areas, your photograph will ultimately suffer.

GROUP PICTURES

Occasionally you will receive an assignment to photograph a group of people. There is added difficulty when working with a number of people atone time. You should consider each person individually, but you should also consider each individual as he relates to the entire group. Every precaution should be taken to make sure each person is shown clearly, and interest is not drawn to one person by some awkward pose or expression.

There are two general types of group pictures — formal and informal. Both are covered in the following text.

Formal

A formal group is one in which several people, uniformly dressed for the occasion, are seated or standing in as nearly the same pose as possible. Each member is placed in approximate y the same relative position so that attention is not drawn to one person (fig. 11-23).

A formal group of about five people can be composed to fill the picture area very nicely. When six to 10 people are being photographed in a group, arrange them in two rows. For larger formal groups, arrange the people in as many rows as necessary to fill the frame

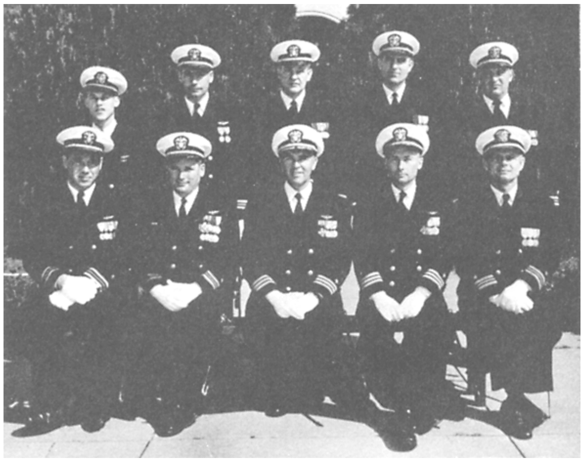

Figure 11-23.—Formal group photograph.

Avoid stringing out one long, narrow line of people across the frame.

When a large group is formed into three or more rows, you must devise some method to prevent the rear rows from being blocked from view. Furthermore, to compose the picture properly and fill it from top to bottom, you should have each row higher than the preceding one. One method is to arrange the group on the steps of a building, bleachers or terrace, so each row is higher than the preceding one. On level ground the first row can be seated, the second standing, and the third standing on benches. Another method which you can use in combination with the first is to elevate the camera so that it is pointing down at an angle on the group. This method is useful as an aid in composing and filling the picture area. A higher camera angle can be useful in eliminating an undesirable background.

Customarily, in a formal group, the highest ranking person is located in the center of the first row and other members of the group arranged alternately to the right and left, according to grade. When all members of the group are the same grade, arrange them according to height, with tall individuals either in the center or at the ends, or occupying the rear rank.

Informal

The informal group is intended to depict some action or tell a story about the individuals. Although the position and pose of each member is carefully planned, the results must appear casual and realistic (fig. 11-24). Members may be seated, kneeling or standing in a variety of positions and do not have to look in the same direction.

One of the most important factors in group photography is arranging people to obtain the best

PHAN K.M. O'Connell

Figure 11-24.—Informal group photograph.

possible composition. Regardless of the number of people in a group, they should be situated to fill the picture and provide the largest possible image size of each person. One exception to this general rule is when the importance of the background is equal to or greater than the group itself. This often occurs with an informal group when the picture is actually intended to emphasize some object or piece of equipment, rather than the individuals. In this case, locate the camera for the best composition of the Object; then arrange the people in the picture to enhance the story being told.

As with individual pictures, you must stay in charge. If you relinquish control, you will have a hard time getting everyone to look at the camera at the same time. Talk to the group and give them your instructions. Make sure your equipment is ready so you do not waste time and lose the group's attention.

DARKROOM TECHNIQUES

LEARNING OBJECTIVE: Recognize the basic techniques used in a darkroon in terms of using solutions and equipment.

After apiece of photographic film or paper has been exposed to light, it is necessary to process the image and change it from a latent to a visible and permanent image. The process is chemical, and although you do not need to understand why the chemicals act as they do, it is important to know which chemicals/solutions are used, the order in which they are used, the recommended temperature and the required time.

"Photographic processing" can be defined simply as a series of chemical changes that accomplish the following goals:

- Develop the image
- Stop the action of development at a desired point
- Fix the visible image to make it permanent
- Wash away all traces of chemicals used
- Dry the photographic material

PHOTOGRAPHIC SOLUTIONS

In the most basic processing, only two solutions are required: a developer and a fixer, plus water for washing. Additional solutions can be used as film conditioners to shorten processing time or to preserve other solutions. The solutions commonly found in military imaging facilities, craft shops and even home labs are as follows:

- Developer
- Stop bath
- Fixer
- Wash
- Wetting agent

Developer

When a photographic emulsion is exposed to light, the silver halides (usually silver bromide and/or silver chloride) in the emulsion change chemically. However, no noticeable change can be seen until the film is developed. The developer causes the affected silver halides to change into metallic silver while having no effect on the unexposed silver halides. The result is that a subject area reflecting the most light will affect the most silver halides and will be the darkest part of the image formed in development. That which is light in the subject is dark in the processed image and inversely, that which is dark in the subject is light in the image.

There are many types and brands of film and developer that all do the job they are designed to do. Reading and following the manufacturer's directions is the soundest advice that can be given. If the manufacturer states that a developer is for general use with film, do not expect good results trying to use it to develop prints. If the manufacturer states that the proper time to develop a certain film is 10 minutes at 70 degrees Fahrenheit (F), do not expect good results at five minutes or at 50 degrees F. If the manufacturer advises thoroughly dissolving Part "A" before adding Part "B," mix the developer that way or be prepared to get inferior results.

Stop Bath

It has become common practice to rinse film in running water after development to retard development and to remove excess chemicals. With prints, it is equally common to use an acid bath to stop the action of the developer and prolong the life of the fixer. In either case, the bath is referred to as a stop bath. Acetic acid diluted with water is the most commonly used stop bath.

Fixer

The fixer is sometimes called "hype" because the main ingredient of the fixer formula, sodium thiosulfate, is also known as hyposulfate.

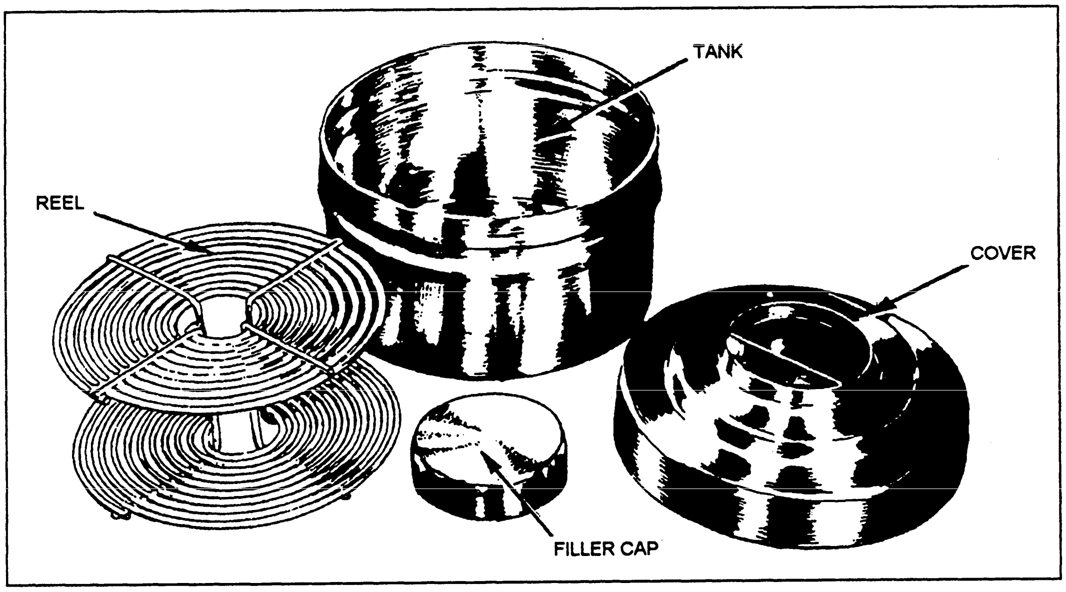

Figure 11-25.—Roll film processing tank and red.

The purpose of the fixer is to convert the silver halides not changed to metallic silver in the developer into a soluble form. These soluble salts diffuse out of the emulsion and into the fixer. Navy imaging facilities use a recovery system to reclaim silver from chemically exhausted fixer.

Most fixer formulas include chemicals to harden the emulsion, which is greatly softened by the alkaline developer, and minimize scratching in later processing and handling. There are many types of fixers and many brands, as is the case with developers. All do their intended job if the manufacturer's directions are followed.

Wash

Running water is not actually required but greatly simplifies the removal of all the chemicals previously used. The wash step is necessary if you desire a permanent image without stains. Wash films and papers with fresh running water for about five minutes.

Wetting Agent

The wetting agent, usually called Photo-Flo, is a chemical designed to reduce the surface tension of water, thus reducing the possibility of water spots forming on film as it dries. It reduces the overall drying time of your films and prints — a point to consider especially on "rush jobs."

DARKROOM EQUIPMENT

The equipment required to process film can be minimal: a processing tank, graduate (measuring cup) and thermometer. During processing, the film must be kept in total darkness until the image is fixed. Although there are other methods for accomplishing this, the simplest method is to use a lighttight stainless steel tank designed for the type and size of film being processed.

TANK DEVELOPING ROLL FILM

LEARNING OBJECTIVE: Identify the steps involved in developing roll film in a tank.

It is more convenient to develop roll film in a small tank than in a tray. The results are usually better, and the possibilities of damage to the film are minimized. Additionally, after the film is loaded in the tank you can turn on the regular room lights and complete processing in normal room light.

Since the film must be loaded in total darkness, you should turn off all lights and allow your eyes to adjust for a few minutes before opening the film container. Examine the room for light leaks (cracks in walls, around doors, around air conditioners or vents). If you can see what you are doing after a few minutes, there is too much light in the room and the condition must be corrected before opening the film cassette.

The most common unit used to develop roll film consists of a stainless steel, center feed, spiraled reel to hold the film; a tank with a lighttight cover; and a filler cap. The construction of tanks and reels differ somewhat among the various manufacturers' models, resulting in differences in loading and use. However, the one you are most likely to use is shown in figure 11-25, and the following discussion will be based on this equipment.

Now that you know what the chemical solutions will do, just follow these steps for processing your film.

ASSEMBLE MATERIALS

Assemble your materials before turning off the lights. Searching for equipment in the dark can be nerve racking. Typical developing equipment for 35mm film includes the tank, can opener, timer, graduate(s), thermometer, scissors and film clip(s). Keep these materials in a handy location, but away from the area immediate yin front of you. This will prevent you from bumping into them or confusing them with other material.

ADJUST WATER TEMPERATURE

Adjust the tap water until a steady temperature of between 65° to 75° F is maintained. Dilute the film developer in a graduate and place it in a tray with the other chemical bottles. Let water run in the tray and wait for the temperature to stabilize, usually in two to three minutes.

FILM REEL LOADING

The proper loading of the film reel **in total darkness** can be the most challenging steps in processing roll film. A good amount of repetition is required to load film successfully. Practice loading several dummy rolls in both white light and total darkness before you turn off the lights and load actual exposed film.

NOTE: Handle the film only by the edges to prevent scratches and fingerprints!

Use the following steps to load the film on the reel:

1. If you are right-handed, position the ends of the wire spiral reel on the top and pointing to the right. If you are left-handed, position the ends on top and pointing to the left.

2. Pickup the film cassette. If a short length of film is left protruding from the 35mm cassette when the film is rewound, you do not have to open the cassette to remove the film. The leader or loading tab on 35mm film can be cut off square (in the light, if you desire) to ease loading, as shown in figure 11-26. However, if the leader is enclosed within the cassette, remove the flat bottom of the cassette with a can opener, as shown in figure 11-27; then cut off the leader as previously described.

3. Bow the film slightly concave to clear the edges of the spiral and clip or hold the film to the core (center) of the reel. The film emulsion must face in, or toward, the center of the reel. The tension on the film should be firm enough to prevent the film from skipping the spiral grooves, but not too firm to cause it to overlap or fall into the same groove twice.

4. Turn the reel while applying a gentle pressure. This pressure will produce a slight curl in the film and allow it to pass into the edges of the reel. **Make sure you keep your thumb and forefinger on the film edges!** As you continue to turn the reel, the film will straighten out and fit into the grooved spaces in the reel. Figure 11-28 shows the proper way to load 35mm film on a wire reel.

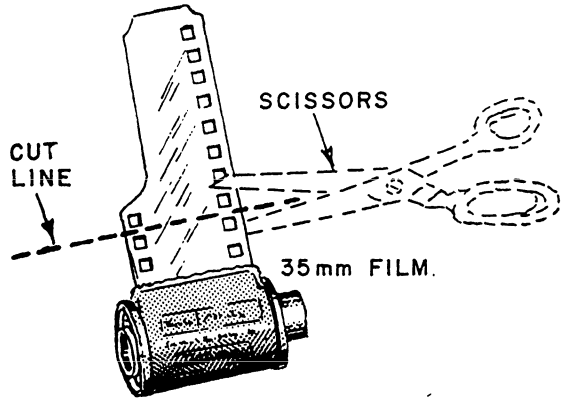

Figure 11-26.—Cutting leader (loading tab) from 35mm film.

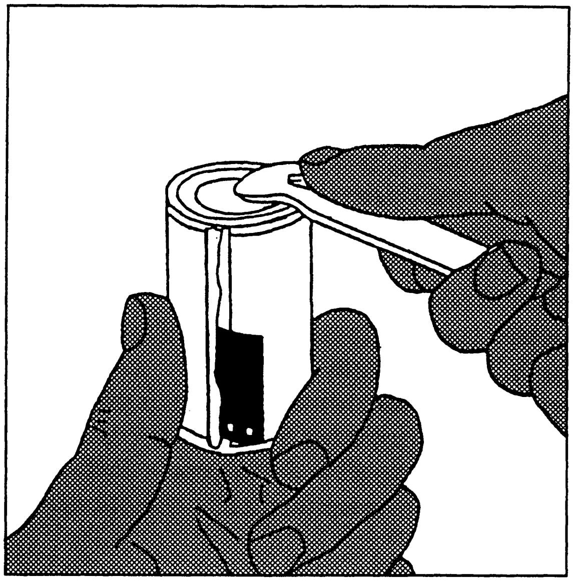

Figure 11-27.—Opening a 35mm film cassette with a can opener.

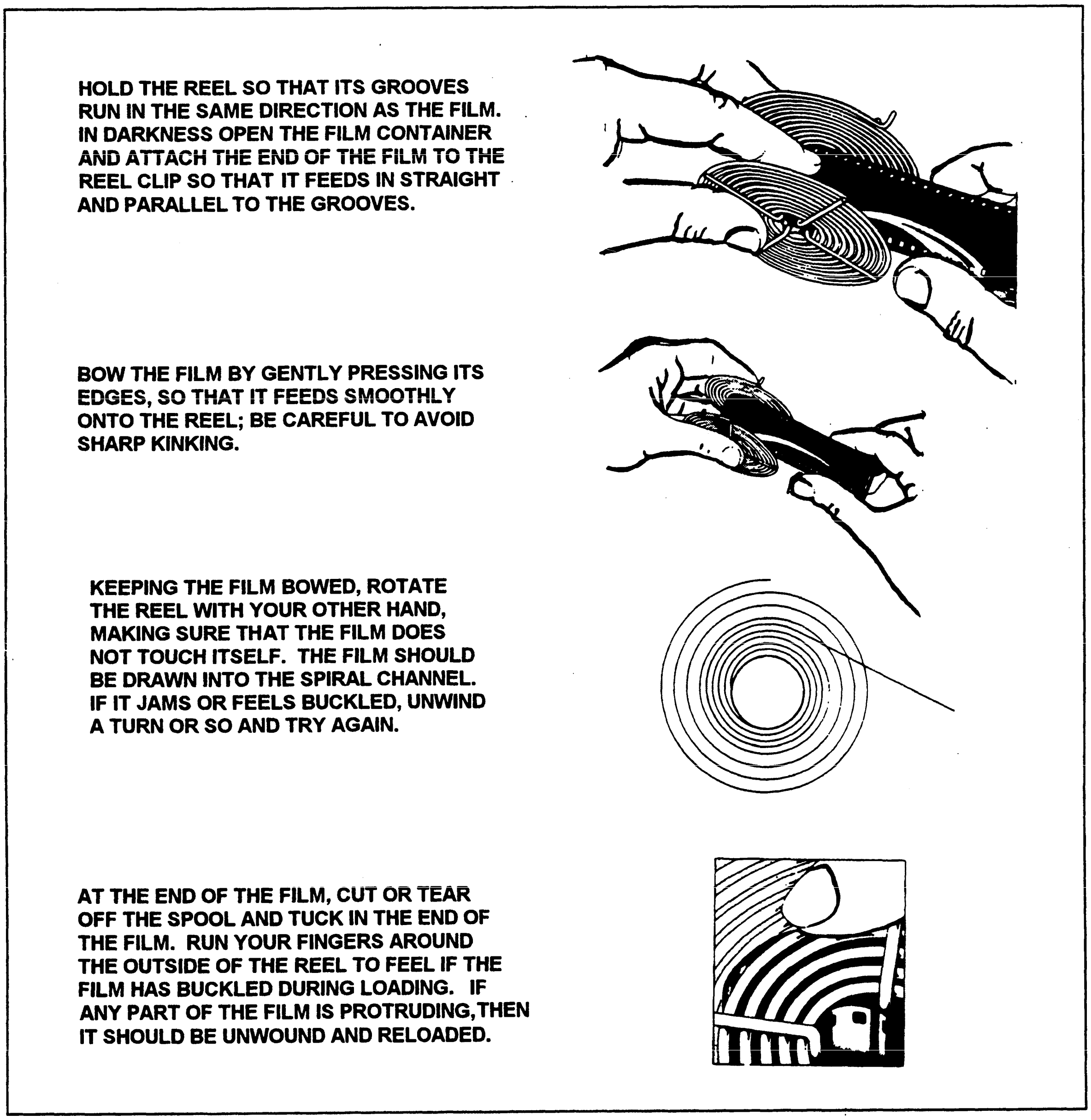

Figure 11-28.—Loading 35mm film on a wire reel.

DEVELOPING THE FILM

After you properly load the film on the reel, you are ready to begin the actual chemical process of film development.

The following are the steps used to process roll film in small tanks:

1. Place the loaded reels into the tank. If the loaded reels do not come to the top of the tank, add empty reels to take up the space. Place the cover and cap on the tank. The lights may now be turned back on. Once the lights are on and before the film is fixed, be careful not to remove the tank cover or the film will be exposed to light and ruined.

2. Hold the tank in one hand and tilt it slightly; pour the developer directly from the graduate into the tank through the light trap pouring hole. As the developer nears the top of the tank, hold the tank level or set it in the sink. Fill the tank to just overflowing. This step should take about 10 to 20 seconds, depending on the tank size.

3. Immediately start the timer once the tank is frill. Replace the cap and strike the tank on the edge of the sink once or twice to dislodge any air bubbles. Now agitate the film by inverting the tank slowly end to end

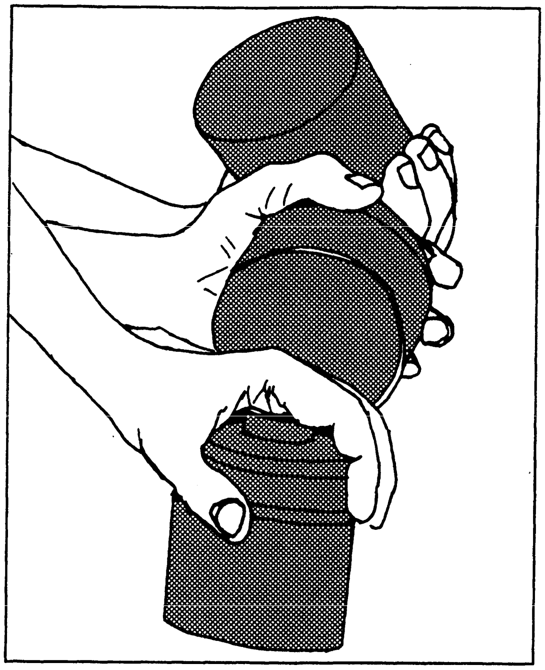

Figure 11-29.—Agitating a small developing tank.

(fig. 11-29). The initial agitation should be 30 seconds. Place the tank in the sink on its bottom (cover up).

4. Once every minute, agitate the film for five seconds by slowly inverting the tank end to end. After each agitation cycle, place the tank back in the sink. If the tank is held during the entire developing period, the heat from your hands may heat the developer and produce unpredictable results.

5. When only 10 seconds of developing time remain, remove the **cap** from the tank cover. Immediately start pouring the developer out of the tank through the light trap pouring hole. **Dispose of the chemicals according to the local instructions of your imaging facility.** This step should take about 10 seconds to complete.

6. When the developer has been emptied from the tank, fill the tank to overflowing with stop bath. The stop bath must be poured into the tank through the light trap pouring hole in the tank cover. Replace the cover cap. Agitate the film in the stop bath for about 30 seconds, using the end-to-end method.

7. When the stop bath portion of the process is complete, pour the stop bath through the light trap hole in the tank cover.

8. With the tank rover still in place, pour fixer into the tank and replace the cap. Dislodge air bubbles and set the timer to the required fixing time. Start the timer and agitate the film, using the same agitation as the developer.

9. When the prescribed fixing time has elapsed, remove the tank cover and pour the fixer from the tank back into the bottle from which it came. Never pour the fixer into the sink. The fixer can be reused and then saved for silver recovery.

10. The film can be washed either in the tank or in a roll film washer. If the tank is used, insert a hose down through the center of the reels until it is about one-half inch from the bottom of the tank. Adjust the water (at the same temperature the film was processed) so a steady overflow is created. Wash the film for about 20 minutes.

11. While the film is washing, rinse the processing tank, tank cover and cap with clean water. Fill the tank with water (check the temperature) and add the wetting agent. After the film has been washed, place the film, still on the reels, into the wetting agent solution. Replace the tank cover and cap and agitate the film in the wetting solution **very slowly** for one minute.

12. After one minute in the wetting solution, remove the loaded film reels from the tank (Do not save the wetting solution.)

13. To dry the film, attach the end of the film to a clip in the drying cabinet (fig. 11-30). Let the film unwind from the reel as you slowly lower the reel.

When the film is unwound, depress the grip clip (if the reel has one) or remove the film from the core of the reel. Squeegee the film and attach a second film clip to the lower end of the film. Close the drying cabinet door and dry the film.

CLEANING UP

After processing, the darkroom and all equipment must be cleaned up immediately. Rinse thoroughly all processing equipment: tanks, reels, thermometers, funnels, and soon, in clean, warm water. Place the clean equipment where it can dry before it is needed for the next processing project. Always leave the darkroom spotlessly clean and in good order.

CONTACT PRINTING

LEARNING OBJECTIVE: Recognize the purpose of contact printing, identify the required contact printing equipment, and determine the procedure used in contact printing.

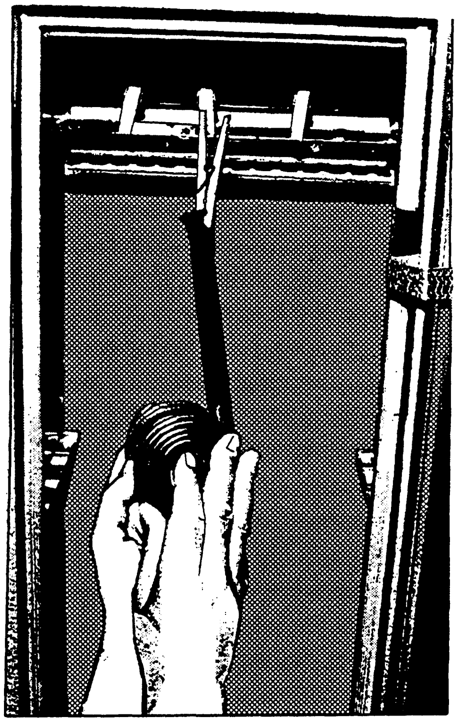

Figure 11-30.—Drying film in a drying cabinet

In Photography, *printing* is the term used to describe the process of making positive images from negatives (and, in some instances, from film positives). The most familiar example is the print made on a paper base. A photographic print is made by passing light through the negative onto a piece of paper that is coated with a light-sensitive emulsion very similar to film.

A contact print is produced by exposing a sheet of photographic printing paper through a negative with the paper emulsion and the emulsion side of the negative in contact with each other. Light is directed through the negative that controls the amount of light transmitted to the paper. The dense areas of the negative pass less light than do the more clear or less dense areas. The image densities formed (after development) in the emulsion of the paper make a positive print that represents the tonal values of the original subject. Furthermore, since the paper is in direct contact with the negative, the print produced is exactly the same image size as the negative.

CONTACT PRINTERS

Contact printing is the quickest, simplest, and most economical method of producing photographic prints. For making proof prints and small volume printing, all you need for a "contact printer" is a sheet of glass, a light source, and some sort of padding.

For making contact proof prints and the occasional contact print job, a glass and a supporting pad are all that are necessary. "Contact printers," consisting of a sheet of glass hinged to a metal frame and a pad assembly, are generally known as proof printers. If such a device is not available or is not large enough for the negatives to be contact printed, a piece of 1/4-inch plate glass and a soft padding (such as a rubber typewriter pad) can be used. Quarter-inch plate glass is heavy enough to keep the negatives and paper flat and in contact during exposure. The glass must be free of flaws, scratches, bubbles and dirt.

CONTACT PRINTING PROCEDURE

Check the lamp to be sure it is operating properly. Rinse the trays with fresh water, and prepare the developer, stop bath and fixing solutions. The trays should be larger than the prints to be produced, and one of the largest or deepest trays available should be used for the fixing bath.

When the solutions are ready, rinse and dry your hands. A supply of printing paper should be available and conveniently near the printer. Place an empty paper box or paper safe near the printer if the prints are not to be processed after each is exposed. Hold the paper in these until the paper is ready to be processed. If the paper is not stored in a paper box or paper safe, it will fog eventually, even under safelight conditions.

Examining the Negative

The first requirement in making a good print is a clean negative. The negative must then be examined to determine the contrast (flat, normal or contrasty) and the approximate exposure time required to produce a quality print. As a novice darkroom worker, you may not be able to make these determinations accurately. However, in a short time, and with a little experience, you will not have any trouble.

Selecting a Printing Filter

Your imaging facility should have a contrast printing filter kit consisting of seven filters in half-step increments from one to four. The number two filter is normal contrast; any filter lower than two decreases the contrast. A filter higher than two increases contrast.

In analyzing a negative to determine the most suitable printing filter, be careful not to confuse contrast with density. When in doubt, it is best to make test prints. If the test print is contrasty, another test print should be made with a lower numbered filter that will lower the contrast. If the original test print does not have enough contrast, change to a filter with a higher number to increase the contrast.

Making a Test Print

The printing exposure is the operation most likely to cause you trouble. Unlike most films that can tolerate some overexposure and underexposure and still yield usable photographs, printing papers must be exposed correctly to produce good prints.

Experience and familiarity with printing equipment does help, but for the beginner, the correct exposure for prints from most negatives is best determinedly making test prints.

The density of a negative is a variable you must consider. Negative density can be determined by making a few test exposures. The exposure time for a negative of average density may be about one to three seconds. If the negative is large, avoid the expensive and wasteful temptation of using a whole sheet of paper. Instead, use a strip about 2 inches wide and as long as the negative for the test exposure. For example, an 8- x 10-inch sheet of paper can be cut into three or four small strips.

After you have determined the filter and the test exposure time, set the timer for the estimated test exposure time. Place the paper test strip over the negative in the printing position. Place the test strip on the negative so the test exposure includes some highlights, midtones and shadow areas. Hold the paper in position with one hand and lower the platen into the printing position. As soon as the platen grips the edge of the paper, move your hand out of the way. When the platen is fully lowered, turn on the printing lights for the test exposure time.

When the test strip has been exposed, develop it for the recommended time. If the image is too dark the exposure was too long. If the image is too light, the exposure was too short.

It is difficult for even an experienced photographer to judge the contrast of a print that has been under- or overexposed. If the test print is too light or too dark the exposure should be changed until the proper density is reached with normal development before you attempt to judge the contrast of the print. A normally exposed print develops gradually, but steadily — shadows first, then midtones, and finally highlights. The image should appear in about 30 seconds, providing that the developer is at the proper strength and temperature. If the image develops very quickly with a general mottling, it was overexposed and the next test should be given less exposure.

When you have produced a satisfactory test print, you can make your production prints from that negative.

If you use a printing frame (glass and pad or proof printer) to make contact prints, the most convenient and economical way to determine exposure and connect contrast is to expose the test strip in progressive steps of, for example, two, four, six and eight seconds. This is done by holding an opaque card on top of the glass and covering three quarters of the paper and exposing one-quarter of the paper for two seconds. The card is then moved to cover one-half of the paper and giving it an additional exposure of two seconds. Move the card so it rovers one-quarter of the paper and give it another two seconds of exposure. Finally, remove the card and give the entire sheet one last exposure of two seconds. This will show a distinct progression of exposures of two, four, six and eight seconds (fig. 11-31). Develop the test strip normally and determine the correct exposure by visual examination in white light.

If the correct exposure appears to be between two steps, the required exposure can usually be estimated with some accuracy. However, further test prints maybe needed.

Exposing and Processing Prints

When a test print develops in the recommended time, rinse it in the stop bath, immerse it in the fixing bath for about 30 seconds, rinse it in fresh water, and inspect it carefully under white light. If the density and contrast of the image look correct under white light, make your first “straight print.”

Place the sheet of printing paper, emulsion-side down, over the negative in the printing position by aligning the paper edges with the paper stops on the mask (if a mask is used). Hold the paper in the printing position with one hand to keep it from slipping out of place when the platen first presses against the edge of the paper, and start the printing cycle as described before. After the printing cycle is completed, remove the paper for processing. Any number of duplicate prints can be made by repeating the printing cycle.

Drop the print, emulsion-side down, into the developer. Immerse it immediately with a quick sliding motion while pushing it under the surface of the solution. Grasp one edge of the print, lift it up, and turn it over. Replace the print, emulsion up, on the surface of

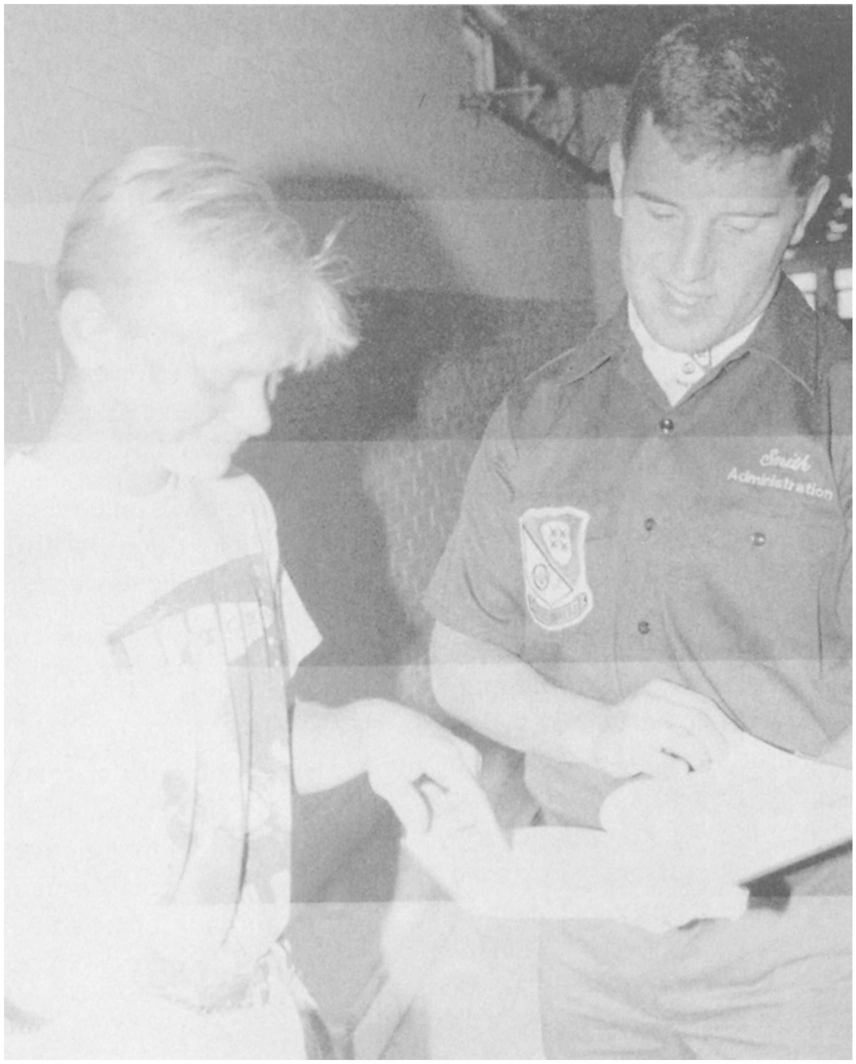

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Figure 11-31.—A processed test strip.

the solution; push it under the surface again and leave it under during the remaining time in the developing tray. The print must be immersed rapidly and evenly to prevent the formation of air bubbles on the emulsion surface. Be sure that all the emulsion gets wet with developer in the shortest time. Agitate constantly for the remaining developing time.

Each type of printing paper has its own working characteristic, differing mainly in the length of time required to develop the image in a given type and strength of developer. A correct print is one that develops to the proper density and contrast in the recommended time.

When the print is fully developed, lift it out of the developer, drain it momentarily, and place it in the stop bath.

After about five seconds in the stop bath, lift the print, drain it briefly, and place it in the fixing bath. Agitate it in the fixing bath for a few seconds and examine it for any defects that might cause it to be discarded. When the inspection is completed, place it, emulsion down, in the fixer and complete the fixing process. Use the manufacturer's recommended fixing time.

Some papers have a tendency to float in the fixing bath, especially if the bath is mixed a little stronger than usual. When prints float in the fixer, they should be handled constantly, or turned facedown to prevent the emulsion from being exposed to the air. The parts of a print exposed to the air during fixing may become stained.

CAUTION

Never attempt to work backwards through the sink-line process. A few drops of fixer on your hands or from a print will contaminate the developer.

PROJECTION PRINTING

LEARNING OBJECTIVE: Recognize the purpose of projection printing, identify the main difference between projection and contact printing, and summarize the advantages of projection printing.

Projection printing is the process of making positive prints by projecting the negative image onto photosensitive paper. The projected image may be enlarged, the same size as the negative image, or reduced in size. When the print images are larger than the negative images, the process is called enlarging. When the print images are smaller than the negative images, the process is called reducing. Because projection printing is usually used to make positive prints with images larger than the negative, projection printers are usually referred to as enlargers. The term *enlarging* generally refers to all forms of projection printing.

DIFFERENCES BETWEEN PROJECTION AND CONTACT PRINTING

Projection printing differs from contact printing because the negative is separated from the paper and the image is projected by a lens onto the sensitized material. The negative is placed between an enclosed light source and a lens. The lens receives the light that passed through the negative and projects the image onto the paper. Changing the distance between the lens and the paper controls the size of the image. The image is focused on the paper by adjusting the distance between the negative and the lens. It is possible to enlarge or reduce the size of the projected image by changing and adjusting these distances.

Enlarging is a very adaptable and versatile process because considerable image and exposure control can be used The main advantage of enlarging over contact printing is that large prints can be made, but there are several other important advantages. The advantages of projection printing areas follows:

- **Cropping (selecting the main area of interest in a negative) can be done and enlarged to any suitable size.** This gives you the opportunity to eliminate unwanted and distracting elements from around the point of interest of the picture.
- **Dodging or burning in.** This allows you to apply local exposure control to bring out more detail in the highlight and shadow areas.
- **Local fogging with a small external light, such as a penlight, to darken selected areas.** For example, to darken the background of a portrait to direct viewer attention to the face.
- **Special effects.** You can change the appearance of the image by use of diffusers or patterns between the lens and paper.
- **Image distortion correction or introduction can be done by tilting the enlarger easel.** An easel is the device used to hold the paper during exposure.

ENLARGERS

In general, all enlargers are similar in design and operation. They have an enclosed light source, some method of providing an even distribution of light over the negative, a negative carrier, a lens, and a means of adjusting the lens-to-negative and lens-to-paper distances. There are two types of enlargers —condenser and diffusion.

Condenser Enlarger

The condenser enlarger (fig. 11-32) is the one most commonly used in Navy imaging facilities. It has a set of condensing lenses between the printing light and the negative. These lenses align and project the light rays evenly through the negative. Since all features of the negative are being enlarged, any flaws also will be enlarged.

Diffusion Enlarger

The diffusion enlarger (fig. 11-33) has a diffusing medium (usually a ground glass) between the light source and the negative to spread the light evenly over the entire surface of the negative. Light emitted from the lamp, as well as that reflected from the parabolic reflector, strikes the diffuser, which, in turn, scatters it in all directions. Thus, when the light reaches the negative, it is traveling in a nondirectional pattern.

Most enlargers have a tungsten lamp as a light source. The lamp is enclosed in a lighttight housing that

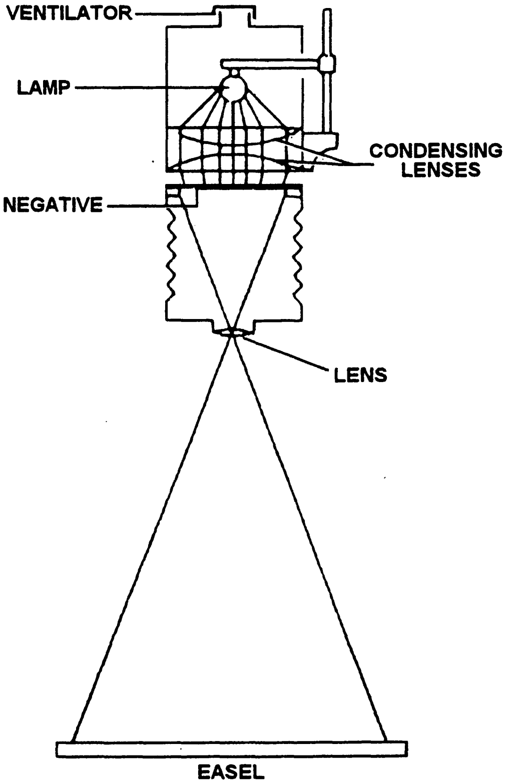

Figure 11-32.—Condenser enlarger.

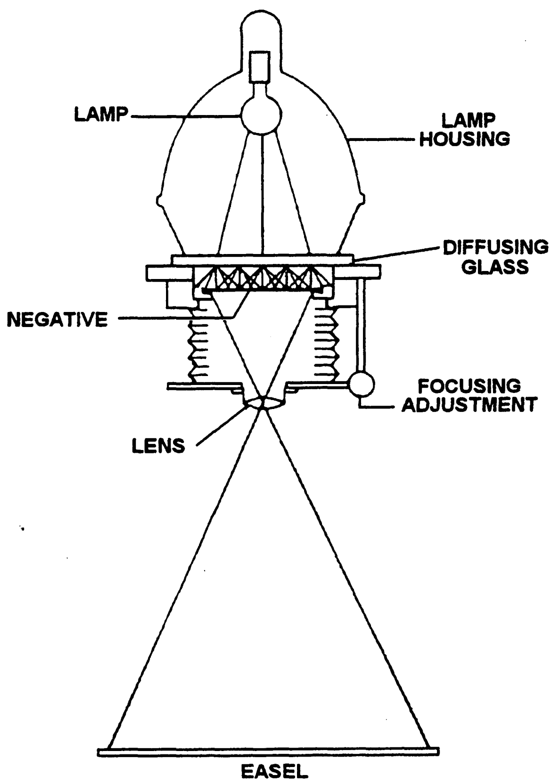

Figure 11-33.—Diffusion enlarger.

is ventilated to prevent excessive lamp heat from damaging the negative. Some enlargers have blowers to circulate air and cool the inside of the lamp housing.

The negative carrier used in an enlarger may be either a dustless type or a glass sandwich type. The dustless type of carrier is made of two metal plates with an opening in the center large enough to hold the negative. The negative is placed between these plates and held in position by its edges. This type of carrier is good for negatives 4 x 5 inches or smaller since these negatives are stiff enough to remain flat. The glass sandwich type of carrier is a holder where the negative is placed between two sheets of glass. This type of holder is used for larger negatives since they have a tendency to sag in the center if they are not supported by glass.

The lens used in an enlarger should have an angle of field large enough to cover the negative being printed. A lens with a focal length approximately equal to the diagonal of the largest negative to be printed will provide sufficient angle of field.

The bellows of an enlarger should be capable of extending at least twice the lens focal length. This amount of bellows extension is necessary for making 1:1 reproductions. Although it is possible to make reductions to any desired size, the bellows on most enlargers cannot be extended far enough to make reductions smaller than 1:1. Smaller reductions can be made by using a longer final-length lens, but a better method is to use a reducing attachment. A reducing attachment consists of a section of supplementary bellows fitted with a longer focal-length lens.

MAKING ENLARGEMENT PRINTS

The darkroom arrangement for enlarging is essentially the same as for contact printing. The safelights should be appropriate for the type of paper being printed. The size of the prints may require larger trays and greater amounts of solution, but they should be setup in the sink the same as for contact printing.

For good enlargements, good negatives, a clean enlarger, clean printing filters, correct exposure and development, and careful processing and finishing are necessary. Although most any negative can be printed by projection, there are a few characteristics that are desirable. A good negative has normal density and contrast. It must be sharp and free from such defects as scratches, abrasions, dust, lint and fingerprints.

Enlarger and Easel Adjustments

Insert the negative in the negative carrier so the emulsion side will be down when placed in the enlarger. In other words, the base of the negative (the shiny side) should be up or facing the lamp when inserted into the enlarger. Clean the negative and be sure there is no dust on it. You can use the light from the enlarger to check for dust. Blow off any dust with a bulb syringe or low-pressure air. Then use a camel-hairbrush to remove any dust that was not removed by the air. Replace the negative carrier with the negative into the enlarger and make sure it is properly seated.

Set the paper guide or masking device on the easel to form the border width needed or use a preset easel. As an aid for composing and accurately focusing the image, place a sheet of white paper in the easel — the base side of the paper is used normally for a focusing sheet — then turn out all white lights.

Turn the enlarger lamp on, open the lens to its maximum aperture, and move the easel around until the desired portion of the image is in the picture area. Raise or lower the enlarger head on the upright standard or column and focus the image. Shift the easel as needed, and continue these adjustments until the image is enlarged (or reduced) to the desired size, focused sharply, and composed correctly on the easel.

The size of projection prints is limited by the optical system used and the working space available. A scene may be printed in sections on several sheets of paper and spliced together.

The picture is easier to compose with the scene right side up. If it is upside down from your point of view, either rotate the negative carrier or remove the earner and reposition the negative. The image will appear right side up on the easel when it is positioned upside down in the negative carrier.

Composing the Image

Adjust the picture until the best composition is obtained. When composing the image, try to connect any errors of image composition in the negative. The way the scene is composed on the negative may be a controlling factor in the final composition. You can change the composition of the picture through cropping. This is done by increasing or decreasing the magnification of the image and readjusting the easel.

After the image is correctly composed and focused, the lens aperture should be stopped down so your basic exposure time is about 10 seconds. An exposure time of 10 seconds allows you to accomplish a normal amount of dodging and is fast enough to be practical for quantity production. The exact amount the lens should be stopped down depends on the density of the negative and the magnification of the image. This can be difficult to determine without experience. If you are new to printing, we suggest you start by stopping down the lens to about f/5.6 or f/8 for a normal negative.

Making a Test Print

There are many factors that effect exposure times in enlarging. Some of these factors include the following:

- The light source and illumination system of the enlarger
- The f/stop of the lens
- The density of the negative
- The degree of enlargement
- The speed of the paper
- The density and color of the contrast printing filter

The best way to determine the correct enlarging exposure is by making a test strip. Although the test strip is the most reliable way to determine exposure, it is not necessary to make a test strip for every enlargement. It is, however, a wise practice whenever you have any doubt as to the exact exposure required.

You can make a test print using the same procedure in contact printing.

STILL DIGITAL PHOTOGRAPHY

LEARNING OBJECTIVE: Recognize the basic process of still digital photography.

Photographic technology is constantly evolving. A fact that underscores this premise is a relatively new procedure that will eventually change the way all photographers take and process pictures. It is called **still digital photography.**

Still digital photography, as the name implies, allows you to take photographs and store them electronically (digitally) in a specially manufactured camera. You can then process the photographs using digital photographic software installed on the hard disk drive of your computer. This software will allow you to view, crop and color correct your photographs. When you are finished, you may “output” the photographs to

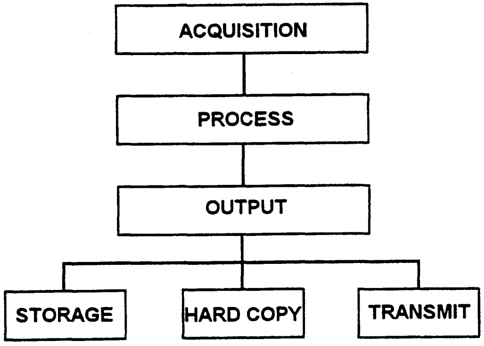

Figure 11-34.—The still digital photography process.

the hard disk drive (for long-term storage), a modem (for transmitting to another computer) or a printer to produce color prints, transparencies or negatives. The still digital photography process is shown in figure 11-34.

DIGITAL CAMERA

As of this writing, the digital camera used by the Navy is the Kodak Professional Digital Camera System (DCS) 200. This system is shown in figure 11-35 and contains the following components:

- Nikon N8008s camera body
- DCS 200 camera back with hard disk drive (multiple capacities available)
- Small Computer System Interface (SCSI) (pronounced "scuzzy")
- 28mm Nikon lens and cover
- Aldus PhotoStyler software plug-in for IBM PC and compatible computers
- Adobe Photoshop software plug-in for Apple Macintosh computer
- AC adapter/charger
- SCSI cables

Do not let the name "still digital photography" intimidate you. Because the DCS 200 uses an unaltered Nikon N8008s camera body, you will work with virtually the same components found on a regular 35mm SLR camera. An LCD (liquid crystal display) indicator on the camera gives you important information, such as the battery charge level, frame count and storage capacity (up to 50 images in the camera body). Handy features include auto-exposure, autofocus and auto-wind. You may even change lenses as you would with the Canon F-1.

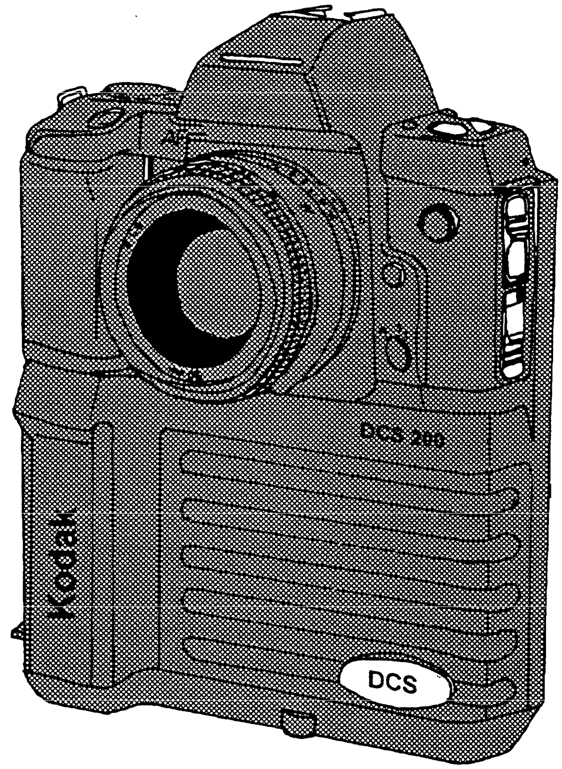

Figure 11-35.—The Kodak Professional Digital Camera System (DCS) 200.

Batteries

The DCS 200 uses six AA batteries. For maximum performance and to prevent damage to the camera from battery leakage, use alkaline batteries. You may also use rechargeable nickel cadmium (NiCad) batteries.

Do not mix NiCad and alkaline batteries in the DCS 200. NiCad batteries have a different output voltage and battery performance will be degraded significantly.

If the camera is left on when not in use (more than 10 minutes), battery life will drop rapidly. Generally, one set of batteries will provide enough power to take and retrieve 50 images.

Initial Settings

We cannot adequately cover the entire operation of the DCS 200 in a TRAMAN of this scope. Therefore, you are encouraged to read the instruction manual that accompanies the system.

The following DCS 200 settings have proven successful for most applications and are provided in this section to help you get started:

- Set the focus mode to "S."

- Set the aperture to f/22 and lock it in position (switch to the right of the distance window on the lens); slide it toward the body of the camera.
- Set the exposure mode to “program” (“P” with no “D” or “H” displayed).
- Set the ISO to 100.
- Set metering to “matrix” (square with larger round dot in center).
- Set the shutter release to “single frame shooting” (S).

Unique Characteristics

You should be aware of two important characteristics of the DCS 200 camera system. One is that it takes four to six seconds after shooting a picture for the camera to save the image and reset itself. The shutter release must be depressed halfway to “wake up” the DCS 200. It takes two seconds for the hard drive to spin up to speed in preparation, for the shot. Once the DCS 200 is “awake,” the battery status and number of images taken is displayed through the window on the back of the camera. At this point, simply point the camera and depress the shutter release. After you shoot the picture, it takes the camera about six seconds to save the image. Expect to wait about eight seconds before taking the next picture.

RETRIEVING YOUR IMAGES

The DCS 200 works with either the Aldus PhotoStyler (IBM PC and compatibles) or Adobe Photoshop (Apple Macintosh) software programs. In this section we will show you how to access and compress your images using the Adobe Photoshop software. Compression of the image is necessary for modem transmission

NOTE: Consult the Apple Macintosh and Adobe Photoshop instruction manuals before attempting this procedure.

Use the following steps to access and compress your images:

1. Place the camera next to the computer before starting. Connect the DCS 200 to the computer using the appropriate connectors/cables.

2. Turn the camera on. Make sure the batteries are providing adequate power.

3. Turn the computer on. Create a folder to store your image files in for transmission.

4. Launch the Adobe Photoshop application.

5. Click on the “File” menu. Holding the mouse/trackball button down, drag down to “Acquire.” Still holding down the mouse/trackball button, drag over to the right and select “Kodak DCS 200.”

6. After a few seconds, the Kodak Professional DCS 200 Camera window will appear (fig. 11-36).

NOTE: You may also get an error window indicating that the camera was not found. If this happens, make sure the camera is on. Then depress the shutter release halfway to “wake up” the DCS 200. Immediately click on the “try again” button in the lower right corner of the error window. If this fails, you may need to check the configuration of the software and connections.

7. The first images you shot should now appear as small black-and-white “thumbnails.” Select an image by clicking on it once. You will see a striped selection ring form around the image.

8. Click on “Acquire” to the right of the images. The camera will begin downloading the image into the Adobe Photoshop application. This takes about one minute.

9. The image will appear on the screen at one-third its actual size (as indicated by the 1:3 at the top of the image window).

NOTE: Consult the Adobe Photoshop instruction manual before making any alterations to the image!

10. Click on the “Image” menu. Holding down the mouse/trackball button, drag down and select “Image Size.”

11. Turn off the “File Size” option by clicking in the marked box.

12. Using the tab key, select the smaller of the height and width dimensions listed (14.056). When this box is highlighted, type in this new size: 7.028. If you have done this correctly, the three sizes listed in the window should read as follows:

- New size: 1.10M
- Width: 10.584
- Height: 7.028

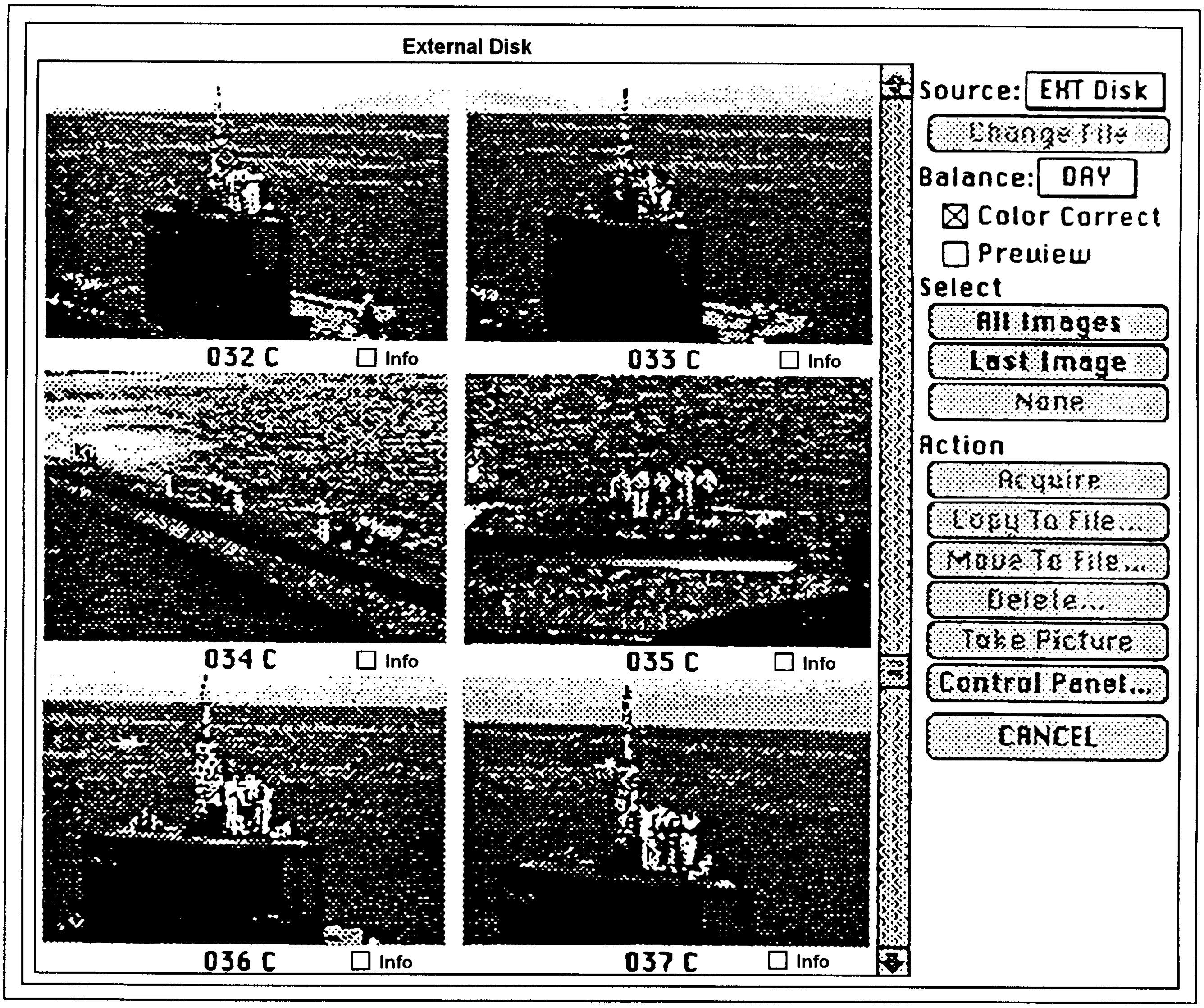

Figure 11-36.—The Kodak Professional DCS 200 Camera window in Adobe Photoshop software.

Click on "OK" and the computer will return to the image. If these values are not reflected, click "Cancel" and begin again at Step 10.

NOTE: If the image was shot vertically instead of horizontally, the height and width measurements will be reversed.

13. Click on the "File" menu. Holding the mouse/trackball button down, drag down to "Export." Still holding down the mouse/trackball button, drag over to the right and select "Adobe JPEG Compress."

14. In the "Adobe JPEG Compress" window (fig. 11-37), move the sliding image quality control bar to the center of the scale directly below "Good." Make sure "File Type" is "JPEG." Select the folder you created earlier to save your files; then enter a name for your file. The file name must end in ".JPEG." Press "Save."

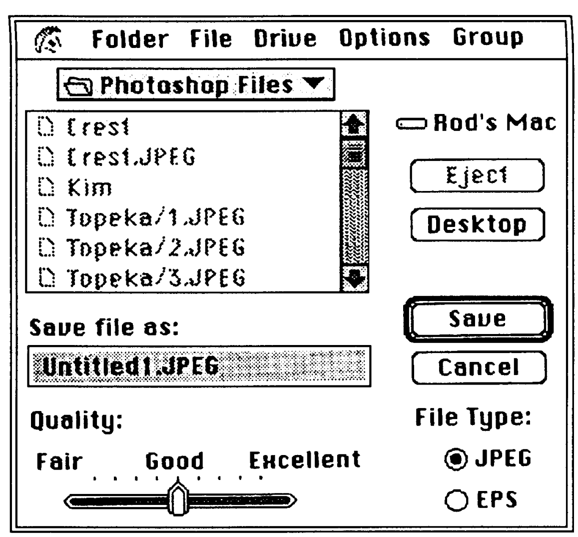

Figure 11-37.—Adobe Photoshop JPEG compress window.

15. Click on the "File" menu. Holding the mouse/trackball button down, drag down to "Close."

You have just successfully retrieved and compressed a digital image. The image is now ready to be transmitted by modem using the telecommunications software of your choice. Repeat Steps 5 through 14 for each image you desire to transmit. When you are finished, quit the Adobe Photoshop application.

In this section we attempted to give you the basics of still digital photography. Further information maybe obtained from the *Photography* (Advanced) TRAMAN or by contacting the CHINFO News Photo Division.

PHOTO JOB ORDERS

LEARNING OBJECTIVE: Identify the purpose of the photo job order and list the required photo job order information.

In areas where Navy imaging facilities are located, one of the easiest means of getting photographic coverage is by properly filling out a job order form. The title of the form may change to include other services, but you should have an understanding of the purpose and basic information needed to fill out the request for services properly.

A job order serves as the authority for requested work the record of the imaging facility and its receipt. It accompanies the work being performed through every phase of the photographic process.

To use the job order successfully, you should develop a good understanding and relationship between your unit and the imaging facility.

In submitting a job order, all information pertaining to the job should be recorded to avoid confusing the photographer performing the actual work. The job order information you must provide includes the following:

- Name of your activity
- Your activity job number
- Job security classification
- Number of views needed
- Size and finish of prints
- Priority and date required
- Location of work
- Name and telephone number of person requesting job
- Person to whom the photographer should report; also the date and time the services are required
- Description of the job to be photographed
- Uniform the photographer should be wearing

The most important information of the job order is the concise description of the job to be photographed. All information pertaining to the job should be described as clearly and complete] y as possible to avoid any confusion for the photographer.

Your relationship with the imaging facility personnel should include an understanding that your job orders always allow for a creative or imaginative shot along with the requested standard or sure-shot. In cases where the photographer's shot is better than the shot requested, use the better shot. **Never** request "one to 10 of every shot." Should you be allowed to select your prints by screening proof sheets or negatives, select only the best shots to satisfy your requirements.

Another method you should use to foster good relations with the imaging facility is to rely on the judgment of an experienced photographer and request the "best view of ..." when ordering prints.